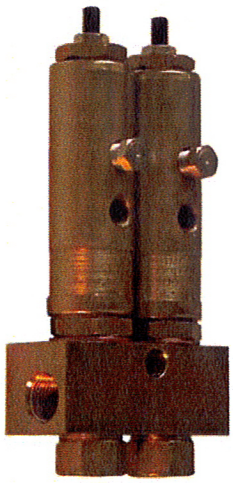
Injector No. 82295, & No. 82294-1 thru 82294-5

Operating Instructions & Service Parts List



Injector type SL-41, No. 82294-2

1. Foreword

Installation work, setting-up, operation and maintenance of Injectors and the Central Lubrication System shall be executed by qualified, trained personnel.

This User Manual is primarily intended to familiarize the user of *Centro-Matic* central lubricating equipment with the supplied product 'Injector' and its specifications. It shall also aid to identify parts by part number and parts for service part inventory.

2. Safety Instructions

Warnings for exposure to hazards that may result in serious personal injury if ignored, are marked in the manual by the general safety symbol.

Safety Symbol
according to DIN 4844-W9

CAUTION

Safety instructions that might result in equipment damage and machine malfunction if ignored, are marked by the word 'CAUTION'.

Also heed safety instructions of the manufacturer of the machine!

3. Specifications of the Product

Manufacturer	Sales & Service
LINCOLN	Lincoln GmbH & Co. KG
St. Louis, Mo 63120-1578	Heinrich-Hertz-Str. 2-8
USA	D-69190 Walldorf

Contact customer service if requiring additional information or service:

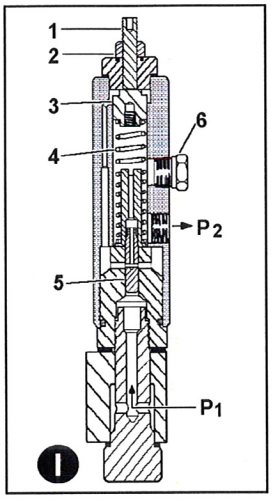
⇒ See bottom line for telephone- and telefax number

Designated Use

- Single-line metering device for oil, for use in *Centro-Matic* single-line lubrication systems.
- Metering device for petroleum based lubricants; if using synthetic oils, the subject lubricant must be compatible with the construction parts of the injector.
- Designed for pressure range of 51-68 bar for operating during lubrication cycle and residual pressure < 10 bar.

Note: The recommended operating pressure is 58 bar for the lubrication cycle.

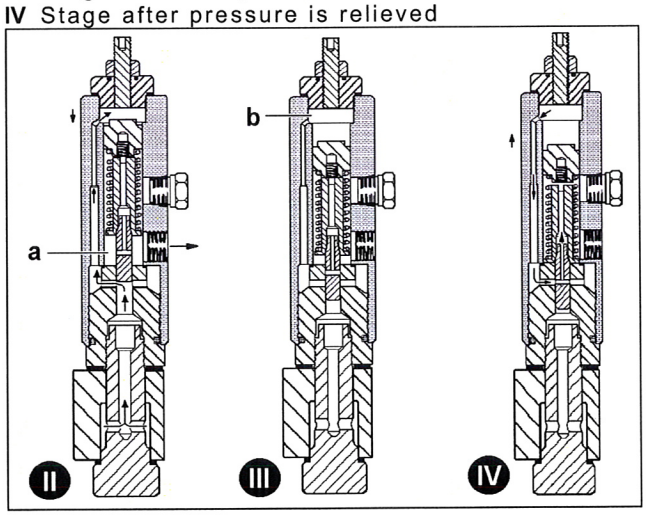
Injector SL-41 can be used in a single-line circuit of Lincoln injectors type SL-42, SL-43 and SL-44 in *Centro-Matic* central lubrication systems for oil.



1 Set screw
2 Lock nut
3 Discharge piston
4 Spring
5 Slide valve piston
6 Second outlet, closed. Outlet for control of output, for pre-filling of feed line, also permits application of combined discharge of injectors through one feed line.

P1 Inlet; *oil supply line from pump.*
P2 Outlet; *oil feed line to lubrication point.*

I Stage during pause time
II Stage on build-up of pressure and lubricating
III Stage after completion of lubricant discharge
IV Stage after pressure is relieved



a Discharge chamber **b** Measuring chamber

General description

Principal operation of Injector SL-41

Fig. I Pause time. Injector relieved from pressure and spring (4) released. Discharge chamber (a) is filled with lubricant from the previous cycle. Chambers (a) and (b) connected through bores in valve piston (5) and passage.

Fig. II Pressure build-up and lubricating. The central lubrication pump builds up pressure in the lubricant supply line and inlet (P1) of the injector. Valve piston (5) forced to move under the pressure of incoming lubricant and opens the passage leading to the piston, admitting the flow of lubricant to the top of the piston into chamber (b) and forcing piston (3) down.

Whilst the filling of chamber (b), the piston (3) forces a precharge of lubricant under pressure from the discharge chamber (a) through the outlet port (P2).

Note: The feed line to the 'lube' point is connected either to P2 or to the (plugged) outlet above.

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Principal operation (continued)

The working pressure (fluid pressure) of the pump must be at least 51 bar for lubricating and shall not exceed 68 bar. The recommended pressure for standard application of *Centro-Matic* single-line oil systems is 58 bar.

Fig. III Completion of the lubricating phase. As piston (3) completes its stroke, it pushes the slide valve piston (5) past the passage, cutting off further admission of lubricant to the passage. The discharge from chamber (a) of the preset amount of lubricant to the outlet is completed; piston and slide valve remain in this position until lubricant pressure in the supply line is vented (relieved) at the pump.

Fig. IV Pressure relief. After completion of the lubricating phase, the supply line (lubricant line between pump and injector) must be relieved from pressure. The pressure at injector inlet (P1) must drop below 10 bar. The re-charge with lubricant will be initiated at a pressure of ~ 10 bar, permitting the compressed spring (4) to release. The spring moves the slide valve to closed position. This opens the port from the measuring chamber and permits the lubricant to be transferred from the top of the piston (3) to the discharge chamber (a). After the preset amount of lubricant is shifted from chamber (b) to chamber (a) and the pressure is vented, the injector returns to its normal (rest) position (Fig. I).

Note: Injector SL-41 is a so-called 'direct' single-line metering device. The injector lubricates under pressure applied by the pump to the injector piston (3). The spring of the injector is only for re-charging purposes.

Injector output adjustment:

⇒ See Section 5 'Operation'.

Technical Data

Injector type	Series SL-41		
Part number	82294 - * Injector with manifold)[1] 82295 Replacement injector		
Output range	0,131-1,31 cm^3		
Output adjustment	Setting by set screw, min. to max. = 12 turns)[2]		
Operating pressure)[3]	minimum	normal	maximum
	51 bar	58 bar	68 bar
	Vent pressure < 10 bar		
Constr. materials	Steel NBR O-rings (static seals)		
Amb. temperature (constr. materials)	TMIN		TMAX
	- 26° C		+ 176° C
Connections: manifold injector	2 x 3/8" NPTF, female thread Outlet 1/8" NPTF female		

Note:

)[1] Character - * of part number stands for substitution by number of injectors mounted on manifold:

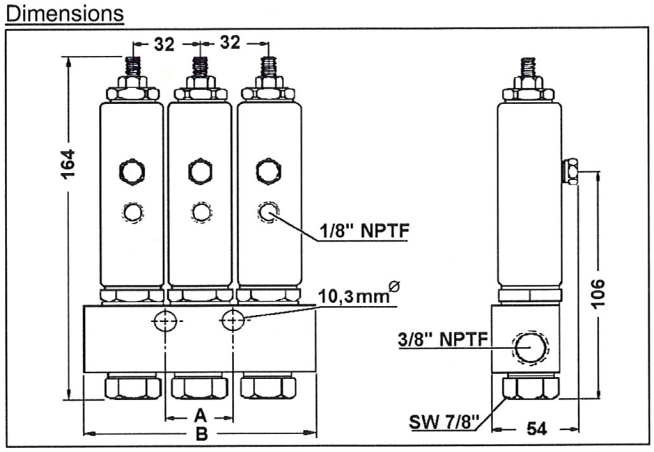
- 1, - 2, - 3, - 4, - 5.

)[2] ***Attention:*** Check output if Set Screw is adjusted to less than ½ turn from minimum.

)[3] 'normal' = recommended operating pressure.

During pause time, after completion of the lubrication cycle, a pressure relief below 10 bar must follow.

Dimensions



Assy. Unit	Manifold	Dim. A	Dim. B
-1	No. 12658	*	64 mm
-2	No. 11962	*	76 mm
-3	No. 11963	32 mm	108 mm
-4	No. 11964	64 mm	140 mm
-5	No. 11965	95 mm	171 mm

* Manifold with 1 mtg. hole

4. Erection & Installation

Warning

Never exceed the maximum working pressure of the *Centro-Matic* system.

Do not carry out any assembly or disassembly works when the system is pressurized or pump/machine are in operation.

CAUTION Before using synthetic lubricants, check compatibility with the construction materials of injectors and other system components.

Required tools

Ring & Open end wrenches of inch-size series (max. 11/16") are required for the installation of injectors; 1/8" hex. key for output setting.

Mounting of injectors

The injectors have two outlets; one outlet must be closed by the fitting supplied with. The outlet for connecting the feed line has a female thread of 1/8" NPTF.

If the 'lube' point (bearing) to be connected requires more than 1,31 cm^3 of lubricant per 'lube' cycle, the outlets of two or more injectors can be externally linked by a connector tube for combined discharge of lubricant; one connector tube is required for each injector connection.

The injector manifolds have a female thread of 3/8" NPTF at both ends.

Order connectors separately if required.

The manifolds have mounting holes; see figure above.

- Injectors can be mounted in any position.

Mount injector in a position which permits access for output adjustment and function control of the injector.

- Location of injectors

⇒ See drawing & instructions of the machine manufacturer.

- Allocation of injector/lubricating point

⇒ See drawing & instructions of the machine manufacturer.

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Note: When using feed line tubing of 1/8" O. D., the feed line between injector and lubrication point must not exceed a length of 7,5 m. (based on oil at 18° C).
Observe on mounting that injector and routing of lines (supply line / feed line) do not interfere with the machine operation. Keep lines clear from damage. Consider max. ambient temperature in case of heat radiation of the machine.

- Replacement Injector; *pls. note for assembly/disassembly*

The injector is fastened with a torque of 61-67,8 Nm to the injector manifold; adhere to torque specification on reassembly of adapter bolt (hex. hd. 7/8"). Have also regard that the adapter gaskets are perfectly seated.

When the injector has been replaced:
– Vent injector and relevant line.
– Adjust lubricant output of the injector.
⇒ See Section 5. 'Operation'.

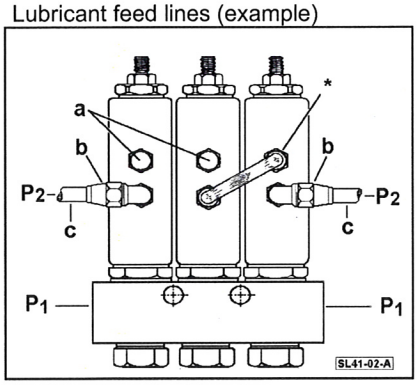
General information concerning the lines for lubricant

Piping and fastening material :
⇒ See drawing & parts list of the machine manufacturer.
As for material quality, resistance to pressure, nominal width and length, the lines used must correspond to the individual operating conditions and must be suitable for the central lubrication system.

- Install lines in accordance with good plumbing practice.

– Securely tighten connectors to avoid leakage; when installing, follow procedure recommended by the fitting manufacturer.
– Tubing and hoses must be clean inside before installing; remove all foreign particles. Steel tubing must be free from rust.
– Use tube cutter for cutting steel tubing. Make rectangular cuts and avoid burrs.
– Observe manufacturer standards concerning the bending radius of steel tubing & pipes and flexible tubes.
– Lines should be securely anchored; use tube clamps to avoid vibration and tearing off of lines.

Lubricant feed lines (example)



Legend:
P1 Supply line inlet
P2 Outlet
a Outlet 1/8" NPTF plugged with fitting.
b Outlet 1/8" NPTF with tube connector
c Lubricant Feed Line
* Connector tube, combines discharge of two injectors to one feed line.

Outlet of injector SL-41

5. Operation

Warning

Never exceed the maximum working pressure of the *Centro-Matic* system.
Do not carry out any assembly or disassembly works when the system is pressurized or pump/machine are in operation.

Setting-up for operation

For setting-up of *Centro-Matic* Central Lubrication Pump and Controller:
⇒ See User Manual of supplied components.
See specific instructions and safety instructions of the manufacturer/supplier of the machine.

Initial operation

Safety Instructions
Wear safety glasses when venting lubricant supply lines. Avoid splashing of oil.

Prior to the initial operation:
⇒ Read specific instructions as well as safety instructions of the manufacturer/supplier of the machine.

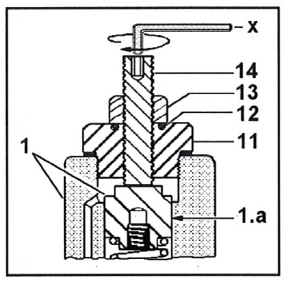
Filling and venting of the lubricant supply line

Before the injectors may be operated the following steps are necessary:
– Fill main line with lubricant
– Vent branch lines and supply line riser.
– Flush supply line while carrying-out the venting procedure.

- Operate pump with low pressure when filling and venting lines.
- Provide assistant with a can to collect the expelled lubricant when venting the lines.
- Check lubricant supply line for any leakage

Please note: The max. working pressure of Injector SL-41 is 68 bar.

Output adjustment of injector type SL-41



Legend:
1 Injector body with fitted piston (**1.a**)
11 Piston stop
12 O-ring
13 Lock nut (SW 7/16" hex.)
14 Set screw
x 1/8" hex. key

Adjustment is only permitted when oil supply line / injectors are depressurized.
Observe lubricant requirement of each lubricating point and the lubricant output setting of the individual injectors:
⇒ See lubrication chart and instructions of the machine manufacturer.

Loosen lock nut (13) with 7/16" wrench.
Turn set screw (14) clockwise by 1/8" hex. key until the spring loaded piston (1.a) is stopped at the lower end.
Then turn set screw (14) counter-clockwise. After 12 full turns of the set screw the injector is set to the max. output of 1,31 cm^3. If a lower output setting is desired, turn the adjusting screw proportionally.
When the injector has been adjusted for the proper lubricant output, lock set screw (14) with lock nut (13).

Note: Retracting the set screw beyond 12 full turns will not increase the lubricant output beyond the max. output!
Attention: Check output of lubricant directly at the outlet of the injector if the set screw is adjusted to less than ½ turn from minimum.

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Note: Before operating the machine, for example after installation works or repairs:

- Main supply line / branch lines and injectors must be filled with lubricant and vented.
- Feed lines must be filled with lubricant and connected with 'lube' points.
- The function of all injectors must have been checked.
- All injectors and the system control for the lubricating intervals must have been adjusted in compliance with the specifications.

⇒ See specific instructions of the machine manufacturer.

Functional check of injectors

The recommended system operating pressure is 58 bar; adjust pump and control system accordingly.

⇒ See User Manual of the relevant central lubrication pump / control system and injectors.

- Initiate manual starting of the lubricating cycle.

After the rising of the pressure to ~ 51 bar the injector dispenses the lubricant through the outlet; after pressure relief < 10 bar the piston moves back to rest position, refilling the discharge chamber with lubricant. Insufficient venting of the supply line system may impair the function of injectors.
When all injectors of the system have been checked and function properly:

Fill feed lines with lubricant.

Before connecting the feed lines to the lubricating points:

- Fill feed lines with lubricant.

Use only lubricant specified by the machine manufacturer for pre-filling.

– Fill lines with lubricant by means of an oil gun.

The feed line can be filled via the alternate outlet port in the injector body.

– Check feed line outlet for evidence of lubricant flow.
– Collect emerging lubricant at the end of the line.

When all lines have been filled:

Connect feed lines.

Operation

During operation of the central lubrication system

– all injectors must have been set to the lubricant output specified by the machine manufacturer.
– the lubrication system controller must have been set to pause time as specified by the machine manufacturer.
– the required operating pressure (fluid pressure) for operating the injectors (lubricant discharge) as well as the subsequent pressure relief of the lubricant supply line for re-charge of the injectors have to be observed.

When the machine is put out of operation

– the central lubrication system must be switched off.

CAUTION

Excess lubrication or insufficient lubrication may result in machine damages.
Do not use contaminated lubricants.

Warning

Never exceed the admissible working pressure of the central lubrication system.

Switch off pump immediately in case of defects or abnormal operating performance.

When putting machine and central lubrication system in operation after a longer shut-off period:

– Check function of the central lubrication system.

Inspection and maintenance

Warning

Never attempt to disassemble the equipment while pump is in operation or system is pressurized.

Do not perform adjustment of injectors while the system is pressurized.

– Check all lubricant lines and injectors regularly for leakproof and proper condition.
– Check function of the central lubrication equipment (pump/controller/injectors) regularly.

- Eliminate defects immediately.

Maintenance

Warning

Never attempt to disassemble the equipment while pump is in operation or system is pressurized.

Before performing any works the machine must be out of operation.
Heed safety instructions of the machine manufacturer.

If machine components being also part of the central lubrication system were removed for service, they shall be properly reassembled before the machine is operated again. Then check the function of the centralized lubrication system as specified. The same applies to maintenance work performed on parts of the *Centro-Matic* central lubrication system.

Trouble shooting

⇒ See User Manual of the relevant central lubrication pump.
⇒ See User Manual of the relevant system control & monitoring equipment and instructions of the manufacturer of the machine.

CAUTION

Operation of the machine with inactive or defective central lubrication system will cause damages to the machine.

⇒ See instructions of the machine manufacturer.

Malfunction of individual lubricant metering devices or damaged lubricant feed lines will cause damage of parts connected to because of lack of lubrication.

6. Repair

Repairs must be carried out by qualified, trained personnel only.

Warning

Do not disassemble injectors when pump / central lubrication system are pressurized.

Before performing any works the machine must be out of operation.
Before servicing shut off pump/central lubrication system and perform pressure relief procedure. Depressurize pump and supply line system.
Always collect lubricant in a can.
After repair of injectors:

– Check function of injectors.

Replacement Injector no. 82295 recommended for service parts inventory. Permits change of injector without remove of the injector manifold.
Note when performing disassembly and overhaul of injectors: Discharge piston as well as slide valve piston of injector SL-41 are fitted type pistons.
After repair, before restart of normal operation of the machine/central lubrication system:

– Adjust output of the relevant injectors as described.
– Vent lubrication line system and check function of the central lubrication system.

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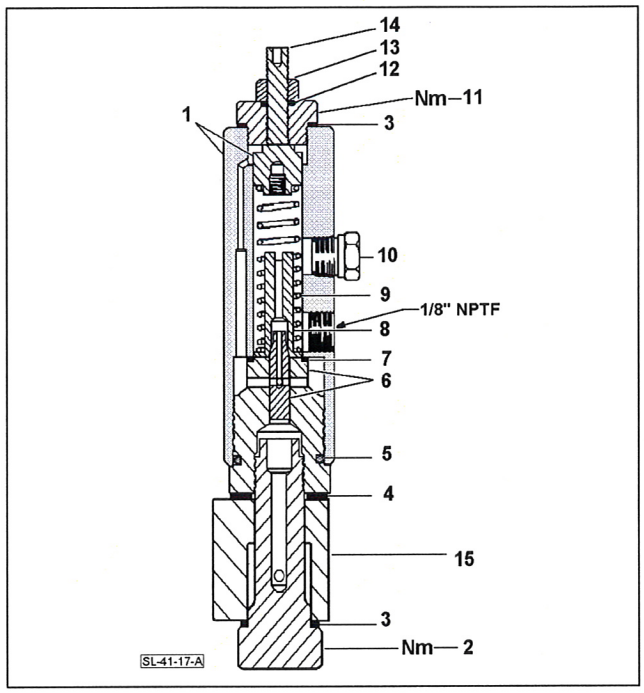
Injector No. 82295, & No. 82294-1 thru 82294-5

Service parts drawing Injector SL-41, Ser. A



Attention: Adhere to torque specifications on re-assembly			
Item 11	Piston stop	torque	34-40,5 Nm
Item 2	Adapter bolt	torque	61-67,8 Nm

Note:
Replacement injector no. 82295 for manifold consist of item 1 thru 14

Item 15 Manifold *ref. to chart*

MANIFOLDS Item 15			
No. 12658	-1 Unit	No. 11964	-4 Unit
No. 11962	-2 Unit	No. 11965	-5 Unit
No 11963	-3 Unit		

Service Parts List Injector SL-41, Ser. A, No. 82295 and 82294 - **

Item	Description	@	Qty.	Part No.
1	INJECTOR BODY ASSY. with fitted piston	*	1	-
2	ADAPTER BOLT SW 7/8" hex.		1	11961
3	GASKET	x	2	31057
4	GASKET	x	1	31064
5	O-RING (NBR)		1	34185
6	BUSHING ASSY. with fitted slide valve piston		1	91157
7	GASKET		1	31014
8	SPRING SEAT		1	12661
9	COMPRESSION SPRING		1	55227
10	PLUG		1	12511
11	PISTON STOP SW 7/8" hex.		1	12660
12	O-RING (NBR)	x	1	34179
13	LOCK NUT SW 7/16" hex.		1	51009
14	SET SCREW 1/8" hex. socket		1	50527
15	MANIFOLD with 2 inlet connections of 3/8" NPTF female			*see chart*

Column @: * . Use replacement injector no. 82295
Column @: **x** Item recommended f. service parts inventory